DOOSAN Document Transmittal

Upper Trishuli-1 HEP (216MW)

Date	DT No.:	SHEET
2022-07-11	UT1-HEP-DHI-PC-D-0043	1 OF 1

DOOSAN NEPAL BRANCH OFFICE	Address & Contact No. : Four Square Building, Naxal, Kathmandu, Nepal (P.O Box : 1387) + 977 1 692 3014	Project No. H20002	DOCUMENT DISPATCHED BY Courier Service ☐ Messenger ☐ Post-Air Freight ☐ Document System or E-mail ■ By hand ■
DOCUMENT DISTRIBUTION	■ POWER CHINA (Subcontractor) ☐ Doosan's Site Office		
SUBJECT	Submission of Review Note RN-0162, RN-0163, RN-0164 and RN-00165		

S. N.	REVIEW NOTE NO.	REVIEW STATUS	DWG. / DOC. NO.	REV.	DWG. TITLE / DOC. DESCRIPTION	REMARK
1	RN-0162	RR	UT1-C-300-CVL-DG-40001	0B	General Layout Drawing of Powerhouse Area	
2	RN-0163	RR	UT1-C-300-CVL-DG-60001	0A	Arrangement Drawing PHC & TC	
3	RN-0164	RR	UT1-C-080-CVL-DG-59001	0B	Excavation and Support Drawings of Tailrace Outlet GC	
4	RN-0165	RR	UT1-C-050-CVL-DC-44002	0D	Slope Stability Calculations of Left Bank Dam Area	
5						
6						
7						
8						
9						
10						
11						
12						

Received by :

Date :

Legend of Review Status
A : APPROVED
AN : APPROVED AS NOTED
RR : RETURN FOR RESUBMISSION
FI : FOR INFORMATION

DHI STAMP

Doosan Enerbility Co., Ltd
DOOSAN Enerbility
Branch Office Nepal

Issued by DHI

Youngsoo Son

Project Manager

Email: youngsoo.son@doosan.com
Doosan Enerbility Co., Ltd.

Discipline : Civil

UPPER TRISHULI-1 HEP (216MW)

Client	**Nepal Water and Energy Development Company Private Limited**
Owner's Engineer	**Tractebel Engineering GmbH / Jade Consult**

REVIEW NOTE

Contractor	**Doosan Heavy Industries & Construction Co., Ltd.**		
Title of the Document	Slope Stability Calculations of Left Bank Dam Area		
Document No.	UT1-C-050-CVL-DC-44002	Revision	0D
Date of Documents	16.06.2022	Received Date	16.06.2022
Transmittal Form No.	UT1-HEP-DHI-D-0279		
Previous Review Date/Status	22.05.2022/RR	Prev. Review Note No.	RN-129
Review Note No.	**RN-0165**	**Present Review Date**	**10.07.2022**
		Present Review Status	**RR**

A: Approved AN: Approved as Noted RR: Returned for Resubmission FI: For Information, only

As in previous versions of the document, the assumptions and calculations are evidently wrong and the results misleading. For example:

The provided strength is divided into saturated strength and unsaturated strength, which is not understood. Generally, the basic principle in soil stability analyses is to consider saturated conditions in soil with effective stresses, depending on the pore water pressure and total stress. This concept was introduced by Terzaghi in 1925.

A load case (#2), the so-called "Rain case" was introduced in Tab. 3.5-1:

Table 3.5-1 Load cases and combination

Conditions		Dead weight	Water load	Vehicle load	Seismic load	Remark
Case 1	Normal operation case	√	√	√		Flood (0.5%)
Case 2	Rain case	√	√	√		Rain percolate through the overburden and saturated strength is considered.

For this case fully saturated conditions were assumed in the slope and "saturated strength parameters" were used in the calculations.

Beside the wrongly assumed "saturated strength parameters", the "rain case" assumes fully saturation up to the ground surface, which is – considering the granular material and its hight permeability – also wrong and produces misleading results. Assuming full saturation to the ground surface is certainly not justified as the case is defined by "Rain percolate….", which means "water flow through…", and hence the material is drained.

From the examples provided above, one clearly identifies the designer of being unaware of basic knowledge and rules for soil slope analyses. It is difficult to understand that upon such faulty design calculations, conclusions were drawn that shall serve as a robust tool for decision making for implementation of a large slope stability structure in a large hydropower project as the UT-1 Project.

The document is returned for resubmission.

Furthermore, it is noted that the document should be on hold, until the exact location and orientation of the weir is determined.

DISCLAIMER

Any approval will not release the Contractor from any of his obligations under the Contract.

Dr. Ulrich Glawe